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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,823	05/03/2005	**Shiro Ogata**	AKSZ 200004US01	4176

27885 7590 09/15/2010

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EXAMINER	
AUSTIN, AARON	

ART UNIT	PAPER NUMBER
1784	

MAIL DATE	DELIVERY MODE
09/15/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,823	OGATA ET AL.	
	Examiner	Art Unit	
	AARON S. AUSTIN	1784	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 21-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 21-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/6/10 has been entered.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification fails to provide proper antecedent basis for the claimed requirement that the titanium dioxide be doped "only with elemental particles" in claim 1 and the use of elemental particles alone in claims 1, 22, and 25. The doping materials in the Examples found in the present specification are derived from metal compounds. The specification does not appear to indicate that 1) the other components used in making the composite are cleansed from the composition, 2) that all portions of the metal compounds other than the metal elements are removed, or 3) the compounds themselves are fully dissolved to leave only the metal elements alone.

The specification does not appear to provide for doping of the titanium peroxide with metal particles as claimed.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-2 and 21-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In particular, claim 1 requires the titanium dioxide be doped "only with elemental particles". This amounts to a negative limitation that is not supported by the specification or claims as originally filed. The doping materials in the Examples found in the present specification are derived from metal compounds. The original disclosure does not appear to indicate that 1) the other components used in making the composite are cleansed from the composition, 2) that all portions of the metal compounds other than the metal elements are removed, or 3) the compounds themselves are fully dissolved to leave only the metal elements alone. The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112,

first paragraph, as failing to comply with the written description requirement. See MPEP 2173.05(i).

Similarly, claims 1, 22, and 25 require doping with metal elements alone. The original disclosure does not appear to indicate that 1) the other components used in making the composite are cleansed from the composition, 2) that all portions of the metal compounds other than the metal elements are removed, or 3) the compounds themselves are fully dissolved to leave only the metal elements alone. Therefore the claims are considered to include new matter.

The remaining claims are rejected as being dependent on rejected claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 and 25 are rejected under 35 U.S.C. 102(b) as anticipated by Ogata et al. (JP2002212463A).

Ogata et al. teach a titanium oxide conductive film forming liquid containing titanium oxide particles in either amorphous or anatase form (e.g. translation at claims 1 or 3). The titanium oxide particles may be doped with materials such as copper, iron, manganese, or nickel (translation paragraphs [0027]-[0028], [0051], [0061], [0067]).

When in amorphous form, the doped titanium oxide composition is not photocatalytically active (translation paragraph [0086]).

Regarding claim 2, the titanium oxide particles may be in either amorphous or anatase form (e.g. translation at claims 1 or 3). Further, the particles are modified with peroxy groups (translation paragraph [0015]).

Regarding claim 25, the titanium oxide particles may be in either amorphous or anatase form (e.g. translation at claims 1 or 3). Further, the particles are modified with peroxy groups (translation paragraph [0015]). The titanium oxide particles may be doped with materials such as copper, iron, manganese, or nickel (translation paragraphs [0027]-[0028], [0051], [0061], [0067]).

Claim Rejections - 35 USC § 102 and 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 21-23 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Elfenthal et al. (US 5,451,252).

Elfenthal et al. teach titanium oxide compounds wherein the titanium oxide photocatalytic activity is decreased by doping titanium oxide particles with metal ions and compounds thereof (Example 1). The dopants comprise any of copper, manganese, nickel, iron, and compounds thereof (column 3, lines 37-64).

Elfenthal et al. do not appear to teach all photocatalytic activity is lost. However, as like materials are used in a like manner as claimed for the same purpose of reduction in photocatalytic activity as claimed, the loss of photocatalytic activity is expected to be as claimed.

Regarding claims 21 and 23, the atomic/molar concentration of the dopant relative to titanium is 0.1 to 2.0 atom% (column 4, lines 6-8). This concentration overlaps the claimed molar ratio of titanium oxide to dopant of 1:0.01 to 1:0.5 (equivalent to a concentration of dopant relative to titanium of 1 to 50%).

Regarding claim 22, Elfenthal et al. teach examples wherein the titanium oxide particles may be rutile-type (column 6, lines 19 and 54). Further, the titanium oxide particles have a photocatalytic activity that is negated through the taught doping process. One of ordinary skill in the art would recognize that a titanium oxide with photocatalytic activity is by definition anatase-type, brookite-type, or rutile-type as these are the three possible forms of photocatalytic titanium oxide (See for example Applicants Reply of 5/5/09 at page 6, lines 1-4).

Claims 1 and 21-23 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over DE2545243A.

DE2545243A teaches light stable titanium oxide compounds wherein titanium oxide photocatalytic activity is decreased by doping titanium oxide particles with metal ions. The dopants may comprise copper or manganese.

DE2545243A does not appear to teach all photocatalytic activity is lost. However, as like materials are used in a like manner as claimed for the same purpose of light stability, the loss of photocatalytic activity is expected to be as claimed.

Regarding claims 21 and 23, the atomic/molar concentration of the dopant relative to titanium is 10^{-4} to 2.5 atom%. This concentration overlaps the claimed molar ratio of titanium oxide to dopant of 1:0.01 to 1:0.5 (equivalent to a concentration of dopant relative to titanium of 1 to 50%).

Regarding claim 22, the titanium oxide particles have a photocatalytic activity that is negated through the taught doping process. One of ordinary skill in the art would recognize that a titanium oxide with photocatalytic activity is by definition anatase-type, brookite-type, or rutile-type as these are the three possible forms of photocatalytic titanium oxide (See for example Applicants Reply of 5/5/09 at page 6, lines 1-4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JP2002212463A).

Ogata et al. teach a titanium oxide conductive film forming liquid as described above.

Ogata et al. do not teach the molar ratio of the titanium oxide to the doping material.

However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the amount of doping material with respect to the amount of titanium oxide for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In particular, as Ogata teaches inclusion of doping materials such as copper, iron, manganese, or nickel improves conductivity (translation paragraph [0027]), one of ordinary skill in the art is provided with motivation to optimize the amount copper, nickel, or compound thereof added to achieve the improvements in conductivity. As like materials are being used in a like manner as claimed, it would be expected that one of ordinary skill in the art would arrive at the claimed molar ratio when optimizing the molar ratio result effective variable.

Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JP2002212463A) in view of Elfenthal et al. (US 5,451,252).

Ogata et al. teach a titanium oxide conductive film forming liquid as described above.

Regarding claim 22, while Ogata et al. teach the advantages of producing a film that does not have photocatalytic activity translation paragraph [0086]), reduction of the photocatalytic activity of the anatase type titanium oxide particles is not taught.

Elfenthal et al. teach titanium oxide compounds wherein the titanium oxide photocatalytic activity is decreased by doping titanium oxide particles with metal ions and compounds thereof (Example 1). The dopants comprise any of copper, manganese, nickel, iron, and compounds thereof (column 3, lines 37-64). Therefore, as Elfenthal et al. clearly teach the ability to reduce photocatalytic activity for titanium oxides having photocatalytic activity through appropriate doping of metal materials, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adjust these same metal materials in the composition of Ogata et al. for the anatase forms of titanium oxide to produce a film producing liquid having the same advantages of the amorphous type titanium oxide (translation paragraph [0086]).

Regarding claims 21 and 23, Elfenthal et al. teach the atomic/molar concentration of the dopant relative to titanium is 0.1 to 2.0 atom% (column 4, lines 6-8). This concentration overlaps the claimed molar ratio of titanium oxide to dopant of 1:0.01 to 1:0.5 (equivalent to a concentration of dopant relative to titanium of 1 to 50%). Therefore, as Elfenthal et al. clearly teach a concentration range/molar ratio overlapping

that claimed is sufficient to reduce photocatalytic activity, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adjust the dopant of Ogata et al. for the anatase form of titanium oxide in the amounts taught by Elfenthal et al. to reduce the photocatalytic activity.

Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the amount of doping material with respect to the amount of titanium oxide for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In particular, as Ogata teaches inclusion of doping materials such as copper, iron, manganese, or nickel improves conductivity (translation paragraph [0027]), one of ordinary skill in the art is provided with motivation to optimize the amount copper, nickel, or compound thereof added to achieve the improvements in conductivity. As like materials are being used in a like manner as claimed, it would be expected that one of ordinary skill in the art would arrive at the claimed molar ratio when optimizing the molar ratio result effective variable.

Regarding claim 24, the titanium oxide particles may be in either amorphous or anatase form (e.g. translation at claims 1 or 3). Further, the particles are modified with peroxy groups (translation paragraph [0015]).

Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JP2002212463A) in view of DE2545243A.

Ogata et al. teach a titanium oxide conductive film forming liquid as described above.

Regarding claim 22, while Ogata et al. teach the advantages of producing a film that does not have photocatalytic activity translation paragraph [0086]), reduction of the photocatalytic activity of the anatase type titanium oxide particles is not taught.

DE2545243A teaches light stable titanium oxide compounds wherein titanium oxide photocatalytic activity is decreased by doping titanium oxide particles with metal ions. The dopants may comprise copper or manganese. Therefore, as DE2545243A clearly teaches the ability to reduce photocatalytic activity for titanium oxides having photocatalytic activity through appropriate doping of metal materials, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adjust these same metal materials in the composition of Ogata et al. for the anatase forms of titanium oxide to produce a film producing liquid having the same advantages of the amorphous type titanium oxide (translation paragraph [0086]).

Regarding claims 21 and 23, DE2545243A teaches the atomic/molar concentration of the dopant relative to titanium is 10^{-4} to 2.5 atom%. This concentration overlaps the claimed molar ratio of titanium oxide to dopant of 1:0.01 to 1:0.5 (equivalent to a concentration of dopant relative to titanium of 1 to 50%). Therefore, as DE2545243A clearly teaches a concentration range/molar ratio overlapping that claimed is sufficient to reduce photocatalytic activity, it would have been obvious to one of

ordinary skill in the art at the time of the claimed invention to adjust the dopant of Ogata et al. for the anatase form of titanium oxide in the amounts taught by DE2545243A to reduce the photocatalytic activity.

Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the amount of doping material with respect to the amount of titanium oxide for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In particular, as Ogata teaches inclusion of doping materials such as copper, iron, manganese, or nickel improves conductivity (translation paragraph [0027]), one of ordinary skill in the art is provided with motivation to optimize the amount copper, nickel, or compound thereof added to achieve the improvements in conductivity. As like materials are being used in a like manner as claimed, it would be expected that one of ordinary skill in the art would arrive at the claimed molar ratio when optimizing the molar ratio result effective variable.

Regarding claim 24, the titanium oxide particles may be in either amorphous or anatase form (e.g. translation at claims 1 or 3). Further, the particles are modified with peroxy groups (translation paragraph [0015]).

Claims 2 and 24-25 are rejected under 35 U.S.C. 103(a) as obvious over Elfenthal et al. (US 5,451,252) in view of Ogata et al. (JP2002212463A).

Elfenthal et al. teach titanium oxide compounds as described above.

Regarding claim 2, Elfenthal et al. do not teach the titanium oxide particles as being anatase-type. However, the titanium oxide particles have a photocatalytic activity that is negated through the taught doping process. One of ordinary skill in the art would recognize that titanium oxide with photocatalytic activity is by definition anatase-type, brookite-type, or rutile-type as these are the three possible forms of photocatalytic titanium oxide (See for example Applicants Reply of 5/5/09 at page 6, lines 1-4). It would be obvious to form anatase-type in selecting possible crystal formations from this finite list. Specifically, as the list of usable materials is short, one of ordinary skill in the art is easily provided motivation to address each of the crystalline forms for suitability for the intended purpose and thus arrive at the use of anatase-type as claimed.

Elfenthal et al. do not teach modification of the titanium oxide with peroxy groups.

Ogata et al. teach a titanium peroxide dispersion for forming conductive films having improved hydrophobicity (translation paragraph [0086]). The dispersion includes liquid containing titanium oxide particles in either amorphous or anatase form (e.g. translation at claims 1 or 3). The titanium oxide particles may be doped with materials such as copper, iron, manganese, or nickel (translation paragraphs [0027]-[0028], [0051], [0061], [0067]). Ogata et al. recognize the benefits of peroxidized titanium oxide particles for forming conductive films but the teachings are limited to the embodiments using non-photocatalytic amorphous titanium oxide (translation paragraph [0086]).

Therefore, as Ogata et al. clearly teach peroxidized titanium oxide particles provides the advantage of improved hydrophobicity, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to peroxidize the photocatalytic titanium oxide of Elfenthal et al.

Claims 2 and 24-25 are rejected under 35 U.S.C. 103(a) as obvious over DE2545243A in view of Ogata et al. (JP2002212463A).

DE2545243A teaches light stable titanium oxide compounds as described above.

Regarding claim 2, DE2545243A does not teach the titanium oxide particles as being anatase-type. However, the titanium oxide particles have a photocatalytic activity that is negated through the taught doping process. One of ordinary skill in the art would recognize that titanium oxide with photocatalytic activity is by definition anatase-type, brookite-type, or rutile-type as these are the three possible forms of photocatalytic titanium oxide (See for example Applicants Reply of 5/5/09 at page 6, lines 1-4). It would be obvious to form anatase-type in selecting possible crystal formations from this finite list. Specifically, as the list of usable materials is short, one of ordinary skill in the art is easily provided motivation to address each of the crystalline forms for suitability for the intended purpose and thus arrive at the use of anatase-type as claimed.

DE2545243A does not teach modification of the titanium oxide with peroxy groups.

Ogata et al. teach a titanium peroxide dispersion for forming conductive films having improved hydrophobicity (translation paragraph [0086]). The dispersion includes

liquid containing titanium oxide particles in either amorphous or anatase form (e.g. translation at claims 1 or 3). The titanium oxide particles may be doped with materials such as copper, iron, manganese, or nickel (translation paragraphs [0027]-[0028], [0051], [0061], [0067]). Ogata et al. recognize the benefits of peroxidized titanium oxide particles for forming conductive films but the teachings are limited to the embodiments using non-photocatalytic amorphous titanium oxide (translation paragraph [0086]). Therefore, as Ogata et al. clearly teach peroxidized titanium oxide particles provides the advantage of improved hydrophobicity, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to peroxidize the photocatalytic titanium oxide of DE2545243A.

Response to Arguments

Applicant's arguments, see the Remarks, filed 7/6/10, with respect to the rejections over Ogata '969 have been fully considered and are persuasive in light of the present amendments. These rejections have been withdrawn.

Applicant's arguments filed with respect to the remaining rejections have been fully considered but they are not persuasive.

First, with respect to the rejections over Ogata '463, Applicant argues the operative mechanism of Ogata '463 is due to increased conductivity of the film forming liquid rather than to its photocatalytic properties as claimed. However, this argument

does not distinguish the product as claimed from the product taught by Ogata '463. More particularly, Ogata '463 teaches a non-photocatalytic composite comprised of titanium peroxide doped with metal elements. As like materials are used in a like manner the products are expected to operate in the same manner. Therefore the rejections are maintained.

Second, Applicant argues the Elfenthal reference describes intracrystalline dopants which are structurally different from the elemental particles claimed. However, the present claims require elemental particles. They do not exclude intracrystalline particles or otherwise limit the structure of the dopant. The dopants of Elfenthal are added as ions or dissolved compounds thereof (column 3, lines 37-41). The metal ions are considered within the meaning of metal particles as claimed. The rejections are therefore maintained.

Third, Applicant argues DE2545243 discloses creating a shell of ions around titanium oxide particles rather than the mixture of fine particles claimed. However, the present claims require elemental particles mixed with titanium oxide particles. The claims do not designate whether the elemental particles are on the surface of the titanium oxide particles or not. The ions of DE2545243 are considered to be within the meaning of the metal particles as claimed and are mixed with titanium oxide as claimed. The rejections are therefore maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AARON S. AUSTIN whose telephone number is (571)272-8935. The examiner can normally be reached on Monday-Friday: 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron S Austin/
Primary Examiner, Art Unit 1784